Missouri Department of Natural Resources
"Integrity and excellence in all we do"

Mercury in Missouri Streams and Lakes

Water Protection Program fact sheet 4/2004

What is mercury?

Mercury is a naturally occurring element found in air, water, soil and rocks. Mercury, often referred to as "Quicksilver", is a heavy, silvery colored liquid and a member of a group of elements called "heavy metals". Common household uses include thermometers, batteries, thermostats, mercury light switches and fluorescent light bulbs. See the section of this fact sheet titled, "What can I do…" for information on mercury-free alternatives to many products.

Why do we have a fish consumption advisory for mercury in largemouth bass?

The Missouri Departments of Conservation, Health and Senior Services, and Natural Resources have sampled fish fillets and whole fish for mercury and other contaminants for a number of years. The Missouri Department of Health and Senior Services has been carefully monitoring the national debate and international health studies related to consumption of fish containing mercury. Results of these studies and new risk estimates by the U.S. Environmental Protection Agency suggest that mercury levels in large-mouth bass over 12 inches long pose a health threat to our children. Therefore the Missouri Department of Health and Senior Services is advising women who are pregnant, who may become pregnant, or nursing mothers and children 12 years of age and younger not to eat any Largemouth Bass over 12 inches in length from anywhere in Missouri.

Why is it safe to eat largemouth bass under 12 inches?

Largemouth bass under 12 inches are smaller, younger fish that consume smaller prey. They have not consumed enough fish over time to raise the concentration of mercury in their meat to levels of concern. Larger fish have lived longer and had more time to accumulate mercury in their meat. Where it is legal to catch largemouth bass under 12 inches, it is safe for everyone to keep and consume the fish.

How does mercury enter streams and lakes?

Mercury is released to the air from natural and man-made sources. Coal-fired power plants, industrial boilers, medical waste incinerators and municipal waste incinerators account for 80 percent of the mercury releases in the United States. Mercury released to the air eventually falls into streams, lakes and watersheds as dust or is carried by rain.

A large percentage of the mercury released to the air goes into the upper atmosphere and can travel thousands of miles before coming back to the ground. Since mercury can travel so far in the atmosphere, it is a state, a national and a global problem.

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How does mercury enter fish?

Mercury falls from the atmosphere in a number of forms. Some of it is pure mercury. Some is combined with other elements to form inorganic “salts”. Much of the mercury that enters streams and lakes is converted by small organisms to a highly toxic form called methylmercury. Methylmercury makes up a very small portion of the mercury in the atmosphere. However, it is concentrated in the aquatic food chain. When snails and insects eat smaller organisms containing methylmercury, it attaches to cells inside their bodies. When small fish eat the snails and insects, the mercury is passed on to their bodies and becomes further concentrated. When larger fish eat the small fish, the mercury is passed on and becomes more concentrated. This process continues until the methylmercury reaches and concentrates in the predatory fish at the top of the aquatic food chain. Large fish at the top of the food chain often have the highest concentration of methylmercury.

Should I avoid eating all fish?

No. While people should observe the fish consumption advisories, they should also keep in mind that fish are an important part of a healthy diet. Fish are a good source of high quality protein, and are low in cholesterol and harmful fats.

What information do you have on mercury concentrations in the water of Missouri streams and lakes?

The Missouri Department of Natural Resources has sampled several streams and lakes for mercury in the water. Mercury levels in streams and lakes are very low and pose no risk from drinking the water. Although mercury concentrations in the water are very low, it is converted to methylmercury and concentrated by the food chain. It is because of this concentration in the food chain that very low levels of mercury in water can cause concern with the consumption of big largemouth bass.

Can I remove the mercury from fish by cleaning them properly?

No, mercury concentrates in the muscle (fillets) of fish and cannot be removed or reduced by cooking, cleaning or removing fat. Cutting away excess fat from the fish reduces some contaminants found in fish, but it will not remove the mercury contamination.

What human health problems are caused by mercury?

The most common problems caused by mercury poisoning are nervous system problems and kidney and liver damage. Common symptoms include insomnia, lack of appetite, irritability, reduced peripheral vision, “pins and needles” feelings, numbness, uncoordination, slowed reaction times and slurred speech.

Who is most likely to be harmed by eating fish contaminated with mercury?

Humans are most sensitive to mercury poisoning when their nervous systems are developing. A mother’s consumption of fish containing too much methylmercury is of greatest concern to her developing embryos, fetuses and nursing children. The consumption of these fish by children under thirteen years old is also a concern. Adults can also be harmed. But the amounts of mercury required to do so are much greater.

What other sources of mercury are in my diet?

Methylmercury is found in most fish and seafood. However, few types of fish have concentrations of mercury of concern to public health officials. Fish consumption advisories for sport fish are issued and maintained on a state-by-state basis. In Missouri, advisories are issued annually by the Department of Health and Senior Services based upon information gathered by the Departments of Natural Resources and Conservation.

In addition to Missouri's advisory, the U.S. Food and Drug Administration has issued a saltwater fish consumption advisory for women of childbearing age who are pregnant, women may become pregnant, nursing mothers and young children. That advisory asks these individuals to avoid eating shark, swordfish, king mackerel and tilefish.

In what other ways may people be exposed to mercury?

Elemental mercury can be found in some common household items such as thermostats, thermometers, fluorescent bulbs and switches. Many of us are familiar with elemental mercury because it was once commonly used in high school chemistry laboratories. Mercury can be released in a home, business or school when items containing mercury break or are repaired. When elemental mercury is open to the air, it evaporates and breathing of the fumes can cause mercury poisoning. Early symptoms include insomnia and lack of appetite. High-level exposures cause problems with the nervous system and can even result in death.

What wildlife problems are caused by mercury?

Studies of wildlife indicate that mercury can also cause nervous system problems among fish-eating mammals. Scientists have also observed both nervous system and reproductive problems in fish eating birds.

Are other states having problems with mercury?

Missouri is one of 44 states with a fish consumption advisory because of mercury contamination. Several Canadian provinces also have advisories in place.

What is Missouri doing about the problem?

The Missouri Departments of Conservation, Health and Natural Resources are continuing to test fish and water for mercury contamination.

The Missouri Department of Natural Resources limits the discharge of mercury from wastewater plants and the emission of mercury from most air pollution sources. However, the department does not have legal authority to regulate the emission of mercury from coal fired power plants.

What can I do about the problem?

First and foremost, follow the advice contained in the fish consumption advisories. Second, reducing the amount of electricity you use can help by reducing the amount of coal burned to produce electricity. As noted earlier, coal-fired power plants are among the largest sources of man-made mercury releases to the atmosphere. You can also help reduce the amount of mercury released to the environment by reducing purchases of mercury-containing products. Some ideas follow.

Product	Recommended Action
Thermometers	Purchase mercury-free thermometers (red bulb) or digital thermometers.
Thermostats	Purchase electronic models that do not use mercury “tilt” switches.
Button Batteries	Purchase mercury-free button batteries (Zinc Air Type).
Quicksilver Maze Toys	Purchase mercury-free toys.
Mercury “Tilt” Light Switches	Purchase mercury-free mechanical or electronic switches.
Fluorescent Light Bulbs	Purchase high efficiency bulbs. While all fluorescent bulbs contain mercury, high efficiency bulbs reduce electricity use and reduce mercury emissions from power plants.
Jewelry With Mercury	Purchase mercury-free jewelry

For more information

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